

Sexual Function Outcomes in Women Treated for Posttraumatic Stress Disorder

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Abstract

Background: This study examined dysfunctional sexual behavior and sexual concerns in women treated for posttraumatic stress disorder (PTSD). There were three objectives: to characterize the relationship between symptoms of PTSD and sexual outcomes, to examine the effect of treatment on sexual outcomes, and to examine the relationship between change in PTSD and change in sexual outcomes.

Methods: Female veterans and active duty personnel with PTSD ($n = 242$), 93% of whom had experienced sexual trauma, were randomly assigned to receive 10 weekly sessions of either Prolonged Exposure or Present-Centered Therapy. PTSD and sexual outcomes were assessed before and after treatment and then 3 and 6 months later.

Results: At baseline, the reexperiencing, numbing, and hyperarousal symptom clusters were related to one or both sexual outcomes. Although prior analyses had shown that Prolonged Exposure resulted in better PTSD outcomes, there were no differences between treatments for either dysfunctional sexual behavior or sexual concerns. However, loss of PTSD diagnosis was associated with improvements in sexual concerns.

Conclusions: The findings suggest that clinically meaningful improvements in PTSD are necessary in order to reduce sexual problems in traumatized women.

Introduction

EXPOSURE TO A LIFE-THREATENING EVENT, such as rape, combat, or a serious accident, can result in the development of posttraumatic stress disorder (PTSD).¹ Almost 1 in 15 U.S. adults have had PTSD at some point in their lives, and the disorder is especially prevalent in women: 3.6% of men vs. 9.7% of women have lifetime PTSD.^{2,3}

PTSD is characterized by symptoms of reexperiencing a traumatic event, avoiding reminders of the event or feeling emotionally numb, and hyperarousal.¹ Reexperiencing symptoms include sudden, unwanted memories of the trauma, nightmares, and even distortions of experience that can make an individual feel as if the event is recurring. The avoidance symptoms include avoidance of anything that serves as a reminder of the trauma—persons and places, as well as thoughts and feelings. Numbing includes the inability to have loving feelings and feeling distant or cut off from others. Hyperarousal symptoms include anger, poor concentration, sleep difficulties, and hypervigilance.

The effects of PTSD extend far beyond its symptoms, however. Individuals with PTSD experience impaired functioning and reduced quality of life.^{4–7} Although most of the research on these domains has focused on psychosocial and occupational functioning, several studies indicate that individuals with PTSD have impaired sexual functioning. Sexual functioning is an important aspect of overall functioning that has adverse personal and even socioeconomic consequences.⁸ The range of problems associated with PTSD includes lack of desire, lower satisfaction, orgasmic dysfunction, and in men, erectile dysfunction.^{9–12} Individuals with PTSD also have an increased likelihood of engaging in risky sexual behavior.^{13,14} For example, Green et al.¹³ found that female college sophomores with PTSD were more likely than their counterparts who did not have PTSD to report a history of pregnancy, abortion, being tested for HIV, and dangerous sexual behavior. Rheingold et al.¹⁵ have suggested that risky sexual behavior may be used as a coping strategy to manage symptoms, much in the same way that individuals with PTSD use alcohol and drugs. Regardless of the reason, it is plausible

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that the sexual problems associated with PTSD are likely to impair interpersonal relationships, self-esteem, and even physical health.

Sexual assault survivors might be expected to have sexual problems even if they do not have PTSD because the act of sex is such an obvious reminder of their past trauma. Studies of sexual assault that have not specifically examined PTSD have found that assault survivors have an increased likelihood of risky sexual behavior and sexual dysfunction.^{16–18} Problems include anorgasmia, sexual anhedonia, having sex before age 15, multiple sexual partners, and having sex before knowing a partner's sexual history.^{16,17} PTSD has an effect in addition to the assault itself, however; sexual problems are greater in sexually assaulted women who develop PTSD vs. those who do not.^{12,13}

Letourneau et al.¹² proposed a learning model to explain the development and maintenance of sexual problems in sexual assault survivors through conditioning of negative affect in response to sexual activity and failure to extinguish this response because sexual activity is then avoided. One implication of the model is that the symptoms of PTSD may be differentially related to subsequent sexual problems; that is, avoidance (of sexual activity) may play a central role in fostering sexual problems in assault survivors. Other symptoms may be influential in all trauma survivors. Numbing symptoms plausibly could lead to sexual problems, such as reduced desire and anorgasmia, and hyperarousal could lead to relationship conflicts (due to anger) and fatigue (due to sleep problems), further impairing sexual function.

The results of one study illustrate these kinds of differential relationships.¹⁹ The investigators administered the Trauma Symptom Inventory (TSI)²⁰ to a sample of community volunteers. Two subscales assess sexual domains: Sexual Concerns, which captures dissatisfaction and dysfunction, and Dysfunctional Sexual Behavior, which captures sexual behaviors that are dangerous, indiscriminant, or used to achieve nonsexual gains. Scores on the Sexual Concerns scale were correlated with numbing and hyperarousal. Scores on the Dysfunctional Sexual Behavior scale were correlated only with numbing symptoms. These findings should be interpreted with some caution because there were no differences between PTSD and no PTSD groups on either sexual outcome. Nevertheless, it makes sense that numbing and hyperarousal could cause or exacerbate sexual dysfunction through effects on interpersonal relationships and the experience of sex itself. However, avoidance of sexual activity, at least in survivors of sexual assault, also is a logical outcome.

Given the sexual problems seen in PTSD patients, what happens when PTSD improves? It is reasonable to expect that sexual problems would improve as well because change in PTSD is related to change in psychosocial and physical functioning.^{21–23} Furthermore, successfully treating PTSD improves functioning,^{24–26} yet there have been only a few investigations of whether treatment also improves the sexual problems associated with PTSD. Two randomized controlled trials^{27,28} and one nonrandomized controlled trial²⁹ of group therapy for PTSD have found weak evidence that sexual problems improved following treatment. A study of two types of individual cognitive behavioral therapy, Cognitive Processing Therapy³⁰ and Prolonged Exposure,³¹ found that dysfunctional sexual behavior and sexual concerns improved from before to after treatment in both groups.³² Effects were

similar for women with and without childhood sexual trauma, which can be associated with a more complex symptom presentation and can be more challenging to treat relative to other types of trauma. Although promising, the studies in this area do not conclusively show that treating PTSD leads to improved sexual outcomes and also have not accounted for medication use.

Understanding the relationship between PTSD and sexual dysfunction is complicated by the fact that selective serotonin reuptake inhibitors (SSRIs), commonly used in the treatment of PTSD, can impair sexual functioning.³³ Most research on the topic has been conducted in men, although studies including women have found SSRI-related sexual problems among women to be quite high, comparable to those among men.^{34–36} For example, Montejo et al.³⁶ reported a slightly higher prevalence of sexual dysfunction among men (62.4% vs. 56.9%) but higher intensity of reductions in libido and anorgasmia in women.

A few studies have examined the effect of SSRIs on the sexual functioning of men with PTSD. Cosgrove et al.⁹ statistically adjusted for medication effects when comparing male combat veterans with and without PTSD and still found that PTSD was associated with more erectile and orgasmic dysfunction and lower sexual satisfaction. However, Kotler et al.,¹⁰ who reported similar findings in a sample of male combat veterans, found that sexual problems were more severe in patients taking SSRIs, even though these patients did not differ from unmedicated patients in PTSD symptom severity. To our knowledge, no one has reported on the effects of SSRIs on sexual functioning in women with PTSD.

We investigated sexual outcomes in women with PTSD by using data from a sample of female veterans and active duty personnel who participated in a randomized clinical trial of Prolonged Exposure.³⁷ The study was the first randomized clinical trial to assess PTSD treatment for active duty and veteran women.³⁸ The high prevalence of PTSD among women who have served in the military makes research on these women particularly important.^{39,40}

Prolonged Exposure is an individual cognitive-behavioral therapy in which a patient is asked to repeatedly recount a traumatic event until the patient's emotional response decreases. The patient also gradually confronts safe but fear-evoking trauma reminders. In the clinical trial,³⁷ Prolonged Exposure was compared with Present-Centered Therapy, a supportive intervention that focused on current problems and served as a control for the nonspecific benefits of therapy. Women who received Prolonged Exposure experienced greater reduction of PTSD symptoms and were more likely than women who received Present-Centered Therapy to no longer meet diagnostic criteria and to achieve total remission. However, the treatment groups did not differ in quality of life or in physical or mental functioning.

We had three objectives in the present study. Our first was to characterize the relationship between symptoms of PTSD and sexual outcomes as measured by the Dysfunctional Sexual Behavior and Sexual Concerns scales of the TSI.²⁰ Based on the findings of McDavitt-Murphy et al.,¹⁹ we hypothesized that numbing and hyperarousal would be related to sexual concerns but that only numbing would be related to dysfunctional sexual behavior. Our second objective was to examine the effect of treatment on sexual outcomes. Based on the effectiveness of Prolonged Exposure in the original trial³⁷

and the Resick et al.³⁰ study that used Prolonged Exposure, we hypothesized that women who received Prolonged Exposure would experience greater improvement than women who received Present-Centered Therapy. We also tested whether being treated for sexual trauma and using SSRIs attenuated the effect of treatment on sexual outcomes. Our third objective was to examine the relationship between change in PTSD and change in sexual outcomes. To ensure that change reflected clinically meaningful improvement, we compared sexual outcomes in women who no longer met criteria for PTSD after treatment with women who still had PTSD. We hypothesized that women who no longer met criteria for PTSD would have improved sexual outcomes relative to women who retained a PTSD diagnosis. The assumption underlying our second and third objectives is that sexual problems in PTSD are secondary to the PTSD, so once PTSD improves, the sexual problems should also resolve.

Materials and Methods

The method is described briefly because details about the original study and primary findings have been reported elsewhere.^{37,38}

Participants

Female veterans and active duty personnel were recruited from 9 VA Medical Centers, 2 VA Readjustment Counseling Centers, and 1 military hospital. Inclusion criteria were current PTSD according to DSM-IV criteria¹; symptom severity ≥ 45 on the Clinician-Administered PTSD Scale (CAPS)⁴¹; ≥ 3 months since experiencing trauma; a clear memory of the trauma that caused PTSD; agreement to discontinue other psychotherapy for PTSD during study treatment; and, if on psychoactive medication, a stable regimen for ≥ 2 months prior to the trial. Psychotherapy for other problems, brief visits with an existing therapist, and self-help groups were allowed. Exclusion criteria were substance dependence not in remission ≥ 3 months; current psychotic symptoms, mania, or bipolar disorder; prominent current suicidal or homicidal ideation; cognitive impairment; current involvement in a violent relationship; or self-mutilation within < 6 months.

A total of 353 women were approached for participation: 33 did not complete initial prescreening; 36 were screened but not enrolled (30 did not complete assessment, 5 failed inclusion/exclusion criteria, and 1 could not be randomized because no therapist was available); 284 were randomized (141 to Prolonged Exposure and 143 to Present-Centered Therapy); and 246 provided outcome data (120 in Prolonged Exposure and 126 in Present-Centered Therapy). There were no baseline differences between Prolonged Exposure and Present-Centered Therapy. The only baseline difference between women who provided outcome data and those who did not is that the former group was less likely than the latter to have current substance abuse (1.2% vs. 7.9%), Fisher's exact test, $p < 0.05$. The only difference between treatments among women who provided outcome data occurred in women receiving PTSD disability payments; the amount of disability was higher in the Prolonged Exposure group than in the Present-Centered Therapy group (61.7% vs. 45.7%), $t(244) = 4.83$, $p < 0.05$.

Our sample consisted of 242 women (118 in Prolonged Exposure and 124 in Present-Centered Therapy) who participated in outcome measurement, including the TSI.²⁰ On av-

erage, participants were 45 years old (range 22–78). Most had some education after high school (88%, $n = 214$), 38% were unemployed ($n = 93$), 30% were married or cohabitating ($n = 73$), and 47% were a nonwhite minority (81 non-Hispanic black, 16 Hispanic, and 16 other). Ninety-eight percent ($n = 237$) had a history of Axis I disorder other than PTSD, including mood disorder ($n = 229$), anxiety disorder ($n = 140$), and substance abuse or dependence ($n = 133$). Seventy-seven percent ($n = 186$) currently had a comorbid disorder, including mood disorder ($n = 152$), anxiety disorder ($n = 117$), and substance abuse ($n = 3$).

Measures

We assessed current PTSD using the CAPS,⁴¹ a structured interview in which the frequency and intensity of the 17 DSM-IV PTSD symptoms are rated on a 0–4 scale. Scores are summed to create a total severity measure. Interrater reliability for CAPS severity was excellent (intraclass correlation = 0.92). For diagnosis, we required that symptoms occur at least monthly with moderate intensity (the “1/2” rule) and that overall severity was ≥ 45 .⁴² Loss of diagnosis was defined according to the CAPS as no longer meeting symptom criteria and having a severity score < 45 . Severity scores were calculated for 4 PTSD symptom clusters. Reexperiencing (Cluster B) and hyperarousal (Cluster D) symptom clusters were defined according to DSM-IV.¹ Separate avoidance and numbing subscales were created for the C cluster, based on evidence that avoidance and numbing form separate clusters.⁴³

Sexual outcomes were measured using scales of the TSI,²⁰ a questionnaire designed to broadly capture the core symptoms of PTSD along with such associated features as depression, anger, dissociation, and sexual problems. Symptoms are rated on a 0 (never) to 3 (often) scale. Raw scores are converted to T-scores for interpretation, with a mean of 50 and a standard deviation (SD) of 10; scores ≥ 65 are considered to be clinically significant. The Dysfunctional Sexual Behavior scale consists of 9 items measuring behaviors such as indiscriminate sexual contact and using sex to deal with distress; for example, “Having sex with someone you hardly knew; Having sex or being sexual to keep from feeling lonely or sad. Getting into trouble because of sex”. High scores may reflect risky sexual behavior.²⁰ The Sexual Concerns scale consists of 9 items measuring sexual dissatisfaction and sexual problems in relationships, for example, “Not being satisfied with your sex life; Bad thoughts or feeling during sex; Feeling ashamed about your sexual feelings or behavior”. High scores are associated with reports of sexual dysfunction and dissatisfaction.²⁰ Baseline assessments on the TSI scales were referenced to the prior 6 months, and all other assessments were referenced to the prior 3 months.

Demographic information was obtained from study enrollment forms. The Structured Clinical Interview for DSM-IV (SCID)⁴⁴ was used to establish exclusion diagnoses. The Military Stress Inventory for Women⁴⁵ and Life Events Checklist from the CAPS⁴¹ were used to assess trauma exposure. The index trauma was that which a participant identified as currently being the most distressing. Because $> 90\%$ of the sample had experienced sexual trauma in childhood or adulthood or both, we used in our analyses an indicator of whether sexual trauma had been identified as the index trauma for PTSD treatment. Information about medication

was collected by a structured interview developed for the study based on a modification of the Longitudinal Interval Follow-up Evaluation⁴⁶ that was supplemented with detailed questions that permitted classification of whether participants were using an SSRI.

Procedure

An institutional review board at each site approved the research protocol. Referring clinicians provided information about inclusion and exclusion criteria to study staff, who in turn met with potential participants to explain the study. Clinical assessors then obtained signed informed consent before administering the assessment battery. Eligible women were randomized to receive 10 weekly sessions of either Prolonged Exposure or Present-Centered Therapy. Each treatment was delivered according to a manual. Therapists were 52 female masters- or doctoral-level clinicians experienced in the treatment of women with PTSD, who received specialized training in Prolonged Exposure or Present-Centered Therapy for the study. Therapists were randomly assigned to the treatment they delivered. All sessions were videotaped and reviewed by an expert supervisor, who provided telephone supervision. Therapist adherence and competence, rated by an independent fidelity monitor, were excellent and equivalent across treatments.³⁷ Assessors, who were blind to each participant's treatment condition, conducted assessments before and after treatment and at 3-month and 6-month follow-up.

Data analysis

Intention-to-treat analysis was performed for all analyses, using data from participants who provided at least one outcome assessment. Pearson correlations were computed to examine relationships among PTSD symptoms and sexual outcomes. To account for missing data and the clustering of participants within therapists in analyses to examine the effects of treatment and loss of diagnosis, outcomes were analyzed using a generalized linear mixed model (SAS PROC MIXED, Cary, NC). The analysis for each outcome consisted of a longitudinal model that included therapist as a random cluster effect and baseline severity, group (treatment or loss of diagnosis, respectively), and site as fixed effects, with the group \times time interaction to test the consistency of the group effect over time. Two additional models were tested for the mixed-model analyses involving the effects of treatment, including (1) type of index trauma (sexual, nonsexual) or SSRI treatment (yes, no) and (2) the interaction of that variable with treatment. To maximally explore how SSRI use might affect treatment outcome, we performed the interaction analyses involving SSRI use in two ways: with SSRI use at baseline as a

fixed covariate and with SSRI use at each time point as a time-varying covariate.

Effect sizes were computed as d , the standardized mean difference. Cohen⁴⁷ defines effect sizes as small ($d = 0.20$), medium ($d = 0.50$), and large ($d = 0.80$).

Results

Table 1 shows mean pretreatment scores for the Dysfunctional Sexual Behavior and Sexual Concerns scales as a function of sexual index trauma and SSRI use at baseline. On average, participants fell below the threshold for clinical significance (65); however, 12.8% had clinically elevated Dysfunctional Sexual Behavior scores, and 40.9% had elevated Sexual Concerns scores.

In Prolonged Exposure, 110 (93.2%) participants had experienced sexual trauma, and 78 (66.1%) identified it as their index trauma. In Present-Centered Therapy, 116 (93.5%) had experienced sexual trauma, and 86 (69.4%) identified it as their index trauma. On average, the index trauma had occurred 25.4 years prior in the Prolonged Exposure group (range 0–58) and 26.5 years prior in the Present-Centered Therapy group (range 0–48). Dysfunctional sexual behavior did not differ as a function of sexual index trauma, $t(240) = 1.70$ (not significant). Women with a sexual index trauma reported greater sexual concerns than women with another type of index trauma, $t(240) = 5.00$, $p < 0.001$.

Across measurement occasions, 49%–57% of the Prolonged Exposure group and 49%–56% of the Present-Centered Therapy group were using an SSRI. There were no differences prior to treatment in either dysfunctional sexual behavior or sexual concerns as a function of SSRI use at baseline, $t(240) = 1.19$ and $t(240) < 1$ (not significant). There also were no differences in PTSD symptom severity prior to treatment as a function of SSRI use, $t(240) < 1$ (not significant).

Relationships among PTSD symptoms and sexual outcomes

Table 2 presents the correlations among PTSD symptoms and sexual outcomes scales before treatment. Dysfunctional Sexual Behavior scores were significantly correlated with re-experiencing, numbing ($p = 0.05$), hyperarousal, and total PTSD severity. Sexual Concerns scores were significantly correlated with numbing, hyperarousal, and total PTSD severity. Given the lack of correlation with the avoidance cluster, we performed exploratory analyses to determine if avoidance was related to sexual problems at least among women who reported a sexual index trauma. Among the 164 women who had a sexual index trauma, avoidance was uncorrelated with either dysfunctional behavior or concerns,

TABLE 1. EFFECTS OF SEXUAL INDEX TRAUMA AND SSRI USE ON SEXUAL OUTCOMES BEFORE TREATMENT

	Sexual index trauma			SSRI use at baseline		
	No	Yes	$t(240)$	No	Yes	$t(240)$
Dysfunctional Sexual Behavior	49.99 (9.80) ^a	52.82 (13.08)	1.70	50.99 (11.97)	52.86 (12.35)	1.19
Sexual Concerns	55.30 (11.35)	63.80 (12.82)	5.00***	60.46 (12.61)	61.69 (13.35)	0.73

^aMeans (SDs).

*** $p < 0.001$.

TABLE 2. CORRELATIONS AMONG PTSD^a SYMPTOMS AND SEXUAL OUTCOMES BEFORE TREATMENT (*N* = 242)

PTSD criterion	Dysfunctional Sexual Behavior	Sexual Concerns
B (reexperiencing)	0.14*	0.08
C.1–2 (avoidance)	0.02	0.10
C.3–7 (numbing)	0.13 [†]	0.16*
D (hyperarousal)	0.16*	0.16*
Total PTSD severity	0.17**	0.18**

^aPTSD was measured using the Clinician-Administered PTSD Scale.⁴⁰

[†] $p = 0.05$; * $p < 0.05$; ** $p < 0.01$.

$r = -0.07$ and 0.02 , respectively. Among the 78 women who had another type of index trauma, avoidance was correlated with dysfunctional behavior ($r = 0.23$, $p < 0.05$), although not with concerns ($r = 0.18$, $p = 0.13$).

The results of multiple regression analyses indicated that none of the four symptom clusters were uniquely associated with either sexual outcome. The overall models accounted for 3.7% of the variance in Dysfunctional Sexual Behavior scores, $F(4, 237) = 2.27$, $p = 0.06$, and 4.1% of the variance in Sexual Concerns scores, $F(4, 237) = 2.55$, $p < 0.05$.

Effects of treatment

Observed means for sexual outcomes are presented in Figure 1. Least squares means from the mixed model analyses are presented in Table 3. Effect sizes, also shown in Table 3, were small. Dysfunctional Sexual Behavior scores decreased from pretreatment to posttreatment only in the Prolonged

Exposure group. Sexual Concerns scores decreased in both the Present-Centered Therapy and Prolonged Exposure groups. Contrary to our expectations, there were no differences between treatments for either outcome, $F_s(1, 35) < 1$. The treatment \times time interactions were not significant for either Dysfunctional Sexual Behavior, $F(2, 627) = 1.59$, or Sexual Concerns, $F(2, 626) = 1.12$. Thinking that the effects of treatment might be more pronounced in women who had clinically significant sexual problems, we repeated these analyses in women who had elevated scores on the Sexual Concerns or Dysfunctional Sexual Behavior scales. We failed to find an effect of treatment in either subgroup.

There were no interactions between treatment and being treated for sexual trauma or using SSRIs: for the Dysfunctional Sexual Behavior scale, sexual trauma, $F(1, 625) < 1$; SSRI use (at baseline), $F(1, 625) = 1.10$; and SSRI use (as a time-varying covariate), $F(1, 624) < 1$; for the Sexual Concerns scale, sexual trauma, $F(1, 624) < 1$; SSRI use (at baseline), $F(1, 624) = 1.13$; and SSRI use (as a time-varying covariate), $F(1, 623) < 1$. For Sexual Concerns, there was a main effect of SSRI use as a time-varying covariate; women using SSRIs had greater sexual concerns than women who did not, $F(1, 623) = 4.29$, $p < 0.05$.

Effects of loss of PTSD diagnosis

A total of 67 (27.8%) women no longer met PTSD diagnostic criteria at the end of treatment, 42 assigned to Prolonged Exposure and 25 assigned to Present-Centered Therapy. Their average amount of decrease in symptom severity was -45.18 on the CAPS (range -12 to -80). The sample size for these analyses was 231 because loss of diagnosis at posttreatment could not be determined for 9 women assigned to Prolonged

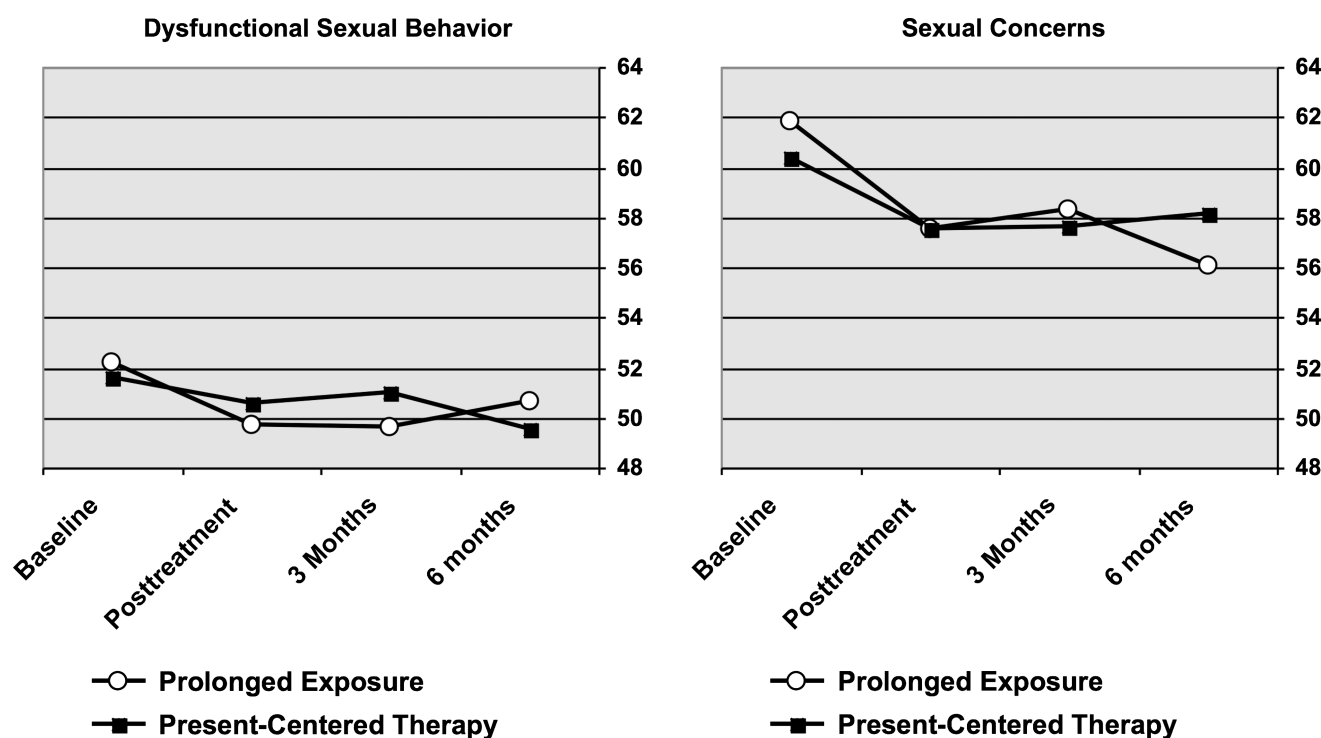


FIG. 1. Observed means for functional and behavioral sexual outcomes in Prolonged Exposure ($n = 118$) and Present-Centered Therapy ($n = 124$) groups on scales of the Traumatic Stress Inventory.²⁰

TABLE 3. LEAST SQUARES MEANS FOR BEHAVIORAL AND FUNCTIONAL SEXUAL OUTCOMES IN PROLONGED EXPOSURE AND PRESENT-CENTERED THERAPY GROUPS^a

	Dysfunctional Sexual Behavior		Sexual Concerns	
	Prolonged Exposure	Present-Centered Therapy	Prolonged Exposure	Present-Centered Therapy
Pre-post effect size (<i>d</i>)	−0.20*	−0.06	−0.36***	−0.25*
Least squares means				
Posttreatment	49.30 ± 1.04	50.66 ± 0.98	55.92 ± 1.18	56.84 ± 1.10
3-month follow-up	49.71 ± 1.12	51.11 ± 1.10	57.17 ± 1.23	56.98 ± 1.22
6-month follow-up	50.22 ± 1.14	49.42 ± 1.11	55.83 ± 1.35	57.64 ± 1.32

^aFor both Dysfunctional Sexual Behavior and Sexual Concerns, *n* = 118 for Prolonged Exposure and *n* = 124 for Present-Centered Therapy. Least squares means are presented ± *SE* and are adjusted for baseline severity. See Materials and Methods for details about the analytical model.

p* < 0.05; **p* < 0.001.

Exposure and 2 assigned to Present-Centered Therapy who failed to participate in posttreatment assessment (but who participated in follow-up assessment). Least squares means from the mixed model analyses are presented in Table 4. Loss of diagnosis was related to Sexual Concerns, $F(1, 607) = 15.61$, $p < 0.001$ but not to Dysfunctional Sexual Behavior, $F(1, 608) < 1$. Those who lost their diagnosis at the end of treatment had significantly lower scores on the Sexual Concerns scale at posttreatment, $t(181) = 3.33$, $p < 0.01$, 3 months, $t(167) = 3.56$, $p < 0.001$, and 6 months, $t(165) = 2.53$, $p < 0.05$.

Discussion

This study is one of very few to have examined sexual behavior and functioning among women treated for PTSD. Prior to treatment, numbing and hyperarousal symptoms were related to both Dysfunctional Sexual Behavior and Sexual Concerns, and reexperiencing symptoms were related to Dysfunctional Sexual Behavior. This pattern differed somewhat from our expectations based on a prior study by McDevitt-Murphy et al.¹⁹ We had expected that hyperarousal would be related to concerns only and that numbing would be related to both outcomes. It is possible that sample differences in symptom severity and trauma exposure may explain the discrepancy. Although both studies used the same measures and 89% of McDevitt-Murphy et al.'s participants were female, only 31% had experienced sexual trauma and 25% of the total sample had PTSD (which was diagnosed according to a more lenient rule than we used).¹⁹ In contrast, 90% of our

sample had experienced sexual trauma and 100% had PTSD. These considerations notwithstanding, perhaps the most salient finding from each of the two studies is the lack of relationship between avoidance and either Dysfunctional Sexual Behavior or Sexual Concerns. If anything, one might expect at least a subset of sexually traumatized women to avoid sexual activity as a reminder of the trauma they have experienced. A more targeted measurement strategy may be needed to capture the ways that trauma-related avoidance could affect sexual behavior. For example, avoidance might be rated as low in a woman who does not have a sexual partner, which may be a direct result of avoiding sexual intimacy and is not captured without careful questioning about both PTSD and sexual activity.

After treatment, Sexual Concerns improved in both the Prolonged Exposure and Present-Centered Therapy groups, and Dysfunctional Sexual Behavior improved in Prolonged Exposure. These findings are comparable to those reported by Resick et al.,³² who found that Dysfunctional Sexual Behavior and Sexual Concerns decreased in women treated with either Prolonged Exposure or Cognitive Processing Therapy. Our findings are also comparable to prior controlled trials of group therapy.^{27–29} In our study, however, the Prolonged Exposure group did not have better sexual outcomes even though these women had greater decreases in PTSD symptoms than women who received Present-Centered Therapy.³⁷ The lack of difference was not explained by either SSRI use or sexual trauma; treatment response was not impaired among women who were treated for sexual trauma or who were taking an

TABLE 4. LEAST SQUARES MEANS FOR BEHAVIORAL AND FUNCTIONAL SEXUAL OUTCOMES AS FUNCTION OF PTSD AT POSTTREATMENT^a

	Dysfunctional Sexual Behavior			Sexual Concerns		
	PTSD	No PTSD	<i>t</i>	PTSD	No PTSD	<i>t</i>
Prepost effect size (<i>d</i>)	−0.13	−0.09	0.53	−0.16*	−0.63***	3.31**
Least squares means						
Posttreatment	50.09 ± 0.93	49.97 ± 1.20	0.10	57.98 ± 1.03	53.28 ± 1.32	3.33**
3-month follow-up	50.76 ± 1.06	50.20 ± 1.33	0.39	59.22 ± 1.18	53.39 ± 1.47	3.56***
6-month follow-up	50.13 ± 1.05	49.44 ± 1.29	0.48	58.62 ± 1.28	54.25 ± 1.56	2.53*

^aData are *M* ± *SE*. For PTSD, *n* = 164 and for No PTSD, *n* = 67. Loss of diagnosis was defined according to the CAPS⁴¹ as no longer meeting symptom criteria and having a severity score < 45.⁴² Outcomes are adjusted for baseline severity and site. See Materials and Methods for details about the analytical model.

p* < 0.05; *p* < 0.01; ****p* < 0.001.

SSRI. The fact that not all PTSD patients have sexual problems may partially explain the limited findings in these studies and in our study as well. When we reran the treatment analyses using data from participants who had clinically elevated scores, there was still no effect of treatment, but this is difficult to interpret because of the loss of power due to the reduced sample size. Treating PTSD in (an adequately powered sample of) patients who have both PTSD and sexual problems may provide a more sensitive test of whether improvements in PTSD lead to improvements in sexual problems.

As we mentioned in the Introduction, the assumption behind the analyses examining treatment and loss of diagnosis is that improvements in PTSD should lead to improvements in sexual problems because the sexual problems are secondary to PTSD. Our findings on the effects of loss of diagnosis are partially consistent with this assumption. Loss of diagnosis was unrelated to changes in Dysfunctional Sexual Behavior, perhaps because the majority of women in this sample had scores indicating a normal level of such behavior. In contrast, women who no longer met criteria for PTSD following treatment had decreases in their Sexual Concerns. Interpreting this finding requires consideration of the original study's findings.³⁷ Whereas other investigators have reported that PTSD treatment improved psychosocial functioning,^{24–26} Schnurr et al.³⁷ found that the effects of Prolonged Exposure Therapy were limited primarily to PTSD symptoms and not to functional outcomes. Perhaps substantial clinical improvement in PTSD, such as loss of diagnosis or even complete remission, is necessary in order to affect functional domains in some patients. Veterans with chronic PTSD who use the VA may be treatment resistant relative to other veterans or non-veterans.⁴⁸ Functional problems in patients with chronic PTSD may be longstanding and intricately embedded in complex, mutually causal relationships with symptoms. The fixed dose of psychotherapy in this trial and most other randomized clinical trials may prevent some or even many patients from no longer meeting diagnostic criteria or at least achieving maximal improvement during the trial.

Another issue is that there may be a lag between the improvement of PTSD symptoms and the improvement of sexual problems. Among individuals treated for psychological problems, improvements in functioning may occur more slowly than improvements in symptoms.⁴⁹ The trajectories may be similar though; we previously reported synchronous, rather than lagged, relationships between improvements in PTSD and improvements in psychosocial and physical functioning.²³ However, it may take longer for improvements in PTSD to affect sexual problems. An individual with PTSD may need to form an intimate relationship before being sexually active or may need to repair more fundamental problems in an ongoing intimate relationship before the sexual problems can be addressed. Within the sexual domain, it also may be important to consider additional treatment specifically targeted at sexual problems in PTSD patients, a need that may be heightened in those who have experienced sexual trauma. In patients undergoing couples therapy for PTSD, these issues could be addressed as a part of more generalized focus on intimacy.⁵⁰

One limitation of our study is that we measured sexual outcomes using a scale designed to evaluate a range of trauma-related symptoms. The TSI has good psychometric properties,²⁰ but a more specific measure may be needed in

order to optimally evaluate sexual problems. In a recent review of sexual dysfunction in women, Meston and Bradford⁵¹ recommend that a thorough evaluation should include a detailed assessment of the sexual problem itself, the patient's sexual and relationship history, her psychological and medical history, and current medication use. Most of the items in the Sexual Concerns scale of the TSI assess subjective distress about sexual thoughts and feelings. The remaining items deal with sexual problems in general (not being satisfied with your sex life, problems in your sexual relations with another person, sexual problems) but do not address specific problems with arousal, desire, orgasm, or pain that caused the subjective distress or dissatisfaction. There is also no information about the onset or duration of sexual problems, relationship history, or partner sexual dysfunction or distress.

When interpreting our findings, it is important to remember that the sample is not representative of all women with PTSD. Women who join the military have an especially high rate of traumatic exposure.^{52,53} Furthermore, our patients had extensive trauma histories and multiple comorbid conditions and, on average, had chronic and severe PTSD. The results thus may not generalize to all women with PTSD, particularly women with less severe PTSD symptoms. Standard PTSD treatments may be sufficient to improve sexual outcomes in these women. Our results may not generalize to men either. It would be useful to replicate our findings in men who had been sexually assaulted in either the military or civilian life. Also, we did not have information about dose or duration of SSRI use, which prevented us from determining if the effects of SSRI use on treatment response may have differed as a function of these factors.

Despite these caveats, our study provides new information about an important topic that has received limited attention: sexual problems in women with PTSD. We encourage further exploration of the topic. Greater knowledge about how PTSD is related to sexual problems and how treating PTSD affects these problems could lead to overall improvements in interpersonal functioning and quality of life.

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Disclosure Statement

E.B.F. is the developer of the Prolonged Exposure treatment used in this study. E.B.F. and P.A.R. have published books on PTSD treatment for which they receive income. No other competing financial interests exist.

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